

## Surfing the Pacific

The breadth and complexity of the earth's oceans are astounding. Near the surface they are the scene of human battles over commercial fisheries, and in their deepest depths they are home to what may be the most primitive creatures in existence. They give rise to large weather patterns such as El Niño that affect the health of many land-based populations, and to small eddies that transport fish larvae from hatching grounds into the open waters.

Much of life on earth depends on the ever-changing physical characteristics of oceans, but studying their complex, interrelated systems has often proved difficult. To make understanding these important ecosystems easier, the Pacific Marine Environmental Laboratory (PMEL) of the National Oceanic and Atmospheric Administration (NOAA)

has compiled much of its data into Internet pages, accessible on the World Wide Web from the PMEL home page located at <http://www.pmel.noaa.gov/pmelhome.html>.

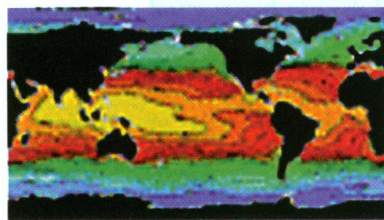
PMEL "theme pages" deal with topics including large-scale phenomena like the El Niño Southern Oscillation, seismicity in the ocean, and life in the Bering Sea, and provide links to PMEL data relevant to each subject, allowing users to see the practical applications of PMEL research. For example, pages linked to the El Niño theme page not only explain how this tropical ocean weather phenomenon affects fisheries and rainfall around the world, but also show how the PMEL sea level analyses and drifting ocean buoy data help scientists predict when the next El Niño event will occur.

Many of the data sets that are linked to the El Niño theme page are presented using Java applets, which allow a quick and smooth interface between the user and PMEL computers. The Tropical Atmosphere Ocean Buoy Array page, for example, provides a map of the ocean with dots marking the position of each buoy. Simply moving the mouse pointer over one of these dots will cause the most current data collected by that buoy to be displayed in a box below. Animated ocean temperature maps and time series of data can also be viewed using Java. For users with Web browsers that are not Java-enabled, all of these data are also available through standard HTML pages and anonymous ftp.

The Bering Sea and North Pacific Ocean theme page provides links to both PMEL data and off-site data that are being used to understand and model the complex relationships between the northern ocean environment and the biota that thrive there. Pages of links are provided via this theme page to data on atmospheric conditions such as wind, pressure, and precipitation; oceanic conditions such as sea temperature, turbulence, and salinity; and life-forms such as phytoplankton, zooplankton, and fish. Abstracts of PMEL articles on each of these subjects can also be obtained through pull-down menus below the links.

Another theme page provides access to research on seismic events in the Pacific Ocean, with earthquake epicenters in geologically active segments of the northeast and eastern equatorial ocean marked on detailed topographic maps. A theme page that deals with research conducted by the NOAA ship *Ka'imimoana* is continuously updated via a satellite link to the ship, which also allows visitors to the PMEL site to send e-mail to the ship's crew. Also linked to the PMEL's home page are theme pages that deal with other ways the laboratory is using satellites to analyze the ocean and efforts being made to recover and utilize old data.

Research that does not fit into any of the theme pages is accessible through the PMEL data link on the home page. For example, users can access information on how the PMEL is using underwater telephone cables to measure currents off the coast of Florida. Other links on the home page access an expansive list of PMEL publications and a calendar of upcoming oceanography-related workshops. The PMEL World Wide Web site is large, complex, and full of information—much like the oceans the laboratory's researchers aim to understand.



years of research conducted by the NCI in response to a 1982 congressional mandate to evaluate the health effects of iodine-131 that was released during 90 nuclear weapons tests in Nevada. That mandate, contained in Public Law 97-414, directs the Secretary of the Department of Health and Human Services to provide estimates of iodine-131 exposure to the U.S. population, to estimate the doses received by individuals, and to assess the risk of thyroid cancer from these doses.

The full NCI report, which will be released 1 October 1997 will fulfill only the first two of these three directives, but information accompanying the executive and technical summaries of the report, which were released on 1 August 1997, provides rough preliminary estimates of cancer risk. The NCI report explains that in order for such estimates to be refined, further research must be done on the effects of internal radiation doses on the thyroid gland. The National Academy of Sciences' Institute of Medicine has been directed to further study cancer risks to individuals and to recommend public health measures to deal with these risks.

The 90 nuclear tests conducted at the Nevada Test Site, mainly in the years 1952, 1953, 1955, and 1957, resulted in the release of 150 million curies of iodine-131. Because iodine-131 decays with a half-life of 8 days, most exposure took place during the first two months following the tests.

For most people, the NCI reports, the major exposure route was consumption of milk from cows that had been grazing on pasture land contaminated by iodine-131. Because of iodine-131's short half-life, individuals who drank milk shortly after it was taken from a family cow had higher exposures than those that drank milk that had been processed and shipped from a dairy farm. Other exposure routes considered in the NCI study are inhalation of contaminated air and ingestion of leafy vegetables, goat's milk, cottage cheese, and eggs.

The NCI will release its full 1,000-page report on the exposures in October, along with a 100,000-page version that includes the full data set with annexes and sub-annexes. The full report will contain exposure estimates categorized by age, gender, and dietary history for each of the 3,071 counties in the contiguous United States, allowing individuals to estimate their personal levels of exposure. The NCI plans to make the information available on CD-ROM and on the Internet.